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09/851,284	05/08/2001	Sanja Durinovic-Johri	1999-0647	3417

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Samuel H. Dworetsky
AT&T CORP.
P.O. Box 4110
Middletown, NJ 07748-4110

EXAMINER	
DAVIS, CYNTHIA L	

ART UNIT	PAPER NUMBER
2665	

DATE MAILED: 01/25/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/851,284	DURINOVIC-JOHRI ET AL.	
	Examiner	Art Unit	
	Cynthia L. Davis	2665	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 November 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date 8/22/01
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments with respect to claims 1-20 have been considered but are moot in view of the new ground(s) of rejection. The only added limitation, that the switch operates based solely upon congestion within the router, is rejected over Masuda in view of the applicant's disclosure.

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

2. Claims 1-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Masuda in view of Rochberger and applicant's disclosure.

Regarding claim 1, Switching, upon detection of congestion on one of the output ports, output of the eligible data packet from a primary output path of the one of the output ports corresponding to a destination address of the eligible data packet to an overflow path for the destination address is disclosed in Masuda, figure 1, element 11 and column 4, lines 4-12. Determining that a data packet from a plurality of data packets is eligible for overflow routing based upon a network policy and at least one of a source port ID, a source IP address, and an intended destination address, wherein not all data packets from the plurality of data packets are eligible for overflow routing is missing from Masuda. However, Rochberger discloses in column 11, lines 46-48, a router storing eligibility for rerouting that is based on the class of service of the packets, which is based upon the destination address. It would have been obvious to one skilled in the

art to base eligibility for rerouting on QOS in the system of Masuda. The motivation would be to reroute higher priority traffic first, to ensure its particular guaranteed QoS. Said switching based upon congestion occurring only in the router is not specifically disclosed in Masuda or Rochberger. However, Masuda does disclose monitoring output port congestion status (which would be congestion occurring within the switch) in column 5, lines 52-54. Further, Applicant discloses in paragraph 5 of the instant specification that there is a direct relationship between congestion outside the router and congestion in the router; congestion outside the router causes the transmit buffer on that link to back up and eventually become full. It would have been obvious to one skilled in the art at the time of the invention to operate the switch based upon congestion occurring in the router. The motivation would be to use the congestion information collected by Masuda to optimally route packets to avoid the congested port and links.

Regarding claim 2, detecting when congestion has abated is disclosed in Masuda at figure 1, element 14. Switching data packets corresponding to the destination address of the eligible data packet from the overflow path back to the primary output path corresponding to the destination address is disclosed in Masuda, figure 1, element 11 and column 5, lines 46-47 (the path selection unit switches the optimum path on a real time basis, so that when the congestion status monitor detects that congestion has abated, the path selection unit will switch back to the original optimum path).

Regarding claim 3, storing a forwarding table in the router is disclosed in Masuda, figure 1, elements 131 and 132. The forwarding table having entries respectively corresponding to destination addresses in the network and identifying at least two output paths from the router for at least one of the destination addresses to enable overflow routing, one of the at least two output paths being identified as a corresponding primary path and other of the at least two output paths being identified as overflow paths is not specifically disclosed in Masuda. However, the H/W table of Masuda holds whichever optimum path has been selected based on the instant congestion levels, sometimes it will be the usual optimum path, sometimes it will be another path, depending on the current congestion status in the network. See Masuda, column 8, lines 4-7. it would have been obvious to one skilled in the art at the time of the invention to have a table holding all of the possible primary and backup paths that are used in Masuda. The motivation would be to compile the primary and overflow path data in one place.

Regarding claim 4, determining, upon detection of congestion of one of the plurality of output ports, which one of the at least two overflow paths from which to output the data based upon an amount of data packets currently assigned to be output from each of the at least two overflow paths is disclosed in Masuda, figure 1, element 12 and column 8, lines 30-36 (if buffer overflow occurs, a portion of the data will be temporarily rerouted to another path not containing any congested links).

Regarding claim 5, determining an amount of data packets currently assigned to be output on each of the at least two output paths, determining a selected overflow path

from the overflow paths has the least amount of data to be output on each of the overflow paths, and assigning the eligible data packet to the selected overflow path is disclosed in Masuda, figure 1, element 12 and column 8, lines 30-36 (if buffer overflow occurs, a portion of the data will be temporarily rerouted to another path not containing any congested links).

Regarding claim 6, monitoring receipt of congestion signals from at least two transmit buffers respectively associated with at least two output ports of the router is disclosed in Masuda, figure 1, element 14. Switching, for all of the destination addresses in the forwarding table affected by the detection of congestion and eligible for overflow routing, from the primary path to one of the overflow paths for transmitting the data is disclosed in Masuda, figure 1, element 11 and column 4, lines 4-12. Determining that a destination address from the destination addresses in the network is eligible for overflow routing based upon a network policy and at least one of a source port ID, a source IP address, and a destination address, wherein not all of the destination addresses in the network are eligible for overflow routing is missing from Masuda. However, Rochberger discloses in column 11, lines 46-48, a router storing eligibility for rerouting that is based on the class of service of the packets, which is based upon the destination address. It would have been obvious to one skilled in the art to base eligibility for rerouting on QOS in the system of Masuda. The motivation would be to reroute higher priority traffic first, to ensure its particular guaranteed QoS. Said switching based upon congestion occurring only in the router is not specifically disclosed in Masuda or Rochberger. However, Masuda does disclose monitoring output

port congestion status (which would be congestion occurring within the switch) in column 5, lines 52-54. Further, Applicant discloses in paragraph 5 of the instant specification that there is a direct relationship between congestion outside the router and congestion in the router; congestion outside the router causes the transmit buffer on that link to back up and eventually become full. It would have been obvious to one skilled in the art at the time of the invention to operate the switch based upon congestion occurring in the router. The motivation would be to use the congestion information collected by Masuda to optimally route packets to avoid the congested port and links.

Regarding claim 7, determining when the congestion has abated based upon status of the congestion signals is disclosed in Masuda, figure 1, element 14. Switching for all of the destination addresses in the forwarding table switched to overflow routing from the overflow path back to the primary path when the congestion has abated is disclosed in Masuda, figure 1, element 11 and column 5, lines 46-47 (the path selection unit switches the optimum path on a real time basis, so that when the congestion status monitor detects that congestion has abated, the path selection unit will switch back to the original optimum path).

Regarding claim 8, storing a forwarding table in the router is disclosed in Masuda, figure 1, elements 131 and 132. The information in the routing table together with the tree table make up a forwarding table for the network, containing information regarding destination addresses in the network (column 5, lines 36-7), and identifying at least two output paths from the router for at least some of the destination addresses

(the H/W table holds whichever optimum path has been selected based on the instant congestion levels, sometimes it will be the usual optimum path, sometimes it will not. Masuda, column 8, lines 4-7). Monitoring receipt of congestion signals from at least two transmit buffers respectively associated with at least two output pods of the router is disclosed in Masuda, figure 1, element 14. Switching for all of the destination addresses in the forwarding table affected by the detection of congestion and eligible for overflow routing from the primary path to the overflow path for transmitting the data is disclosed in Masuda, figure 1, element 11 and column 4, lines 4-12. Determining that a destination address from the destination addresses in the network is eligible for overflow routing based upon a network policy and at least one of a source port ID, a source IP address, and a destination address, wherein not all of the destination addresses in the network are eligible for overflow routing is missing from Masuda. However, Rochberger discloses in column 11, lines 46-48, a router storing eligibility for rerouting that is based on the class of service of the packets, which is based upon the destination address. It would have been obvious to one skilled in the art to base eligibility for rerouting on QOS in the system of Masuda. The motivation would be to reroute higher priority traffic first, to ensure its particular guaranteed QoS. Said switching based upon congestion occurring only in the router is not specifically disclosed in Masuda or Rochberger. However, Masuda does disclose monitoring output port congestion status (which would be congestion occurring within the switch) in column 5, lines 52-54. Further, Applicant discloses in paragraph 5 of the instant specification that there is a direct relationship between congestion outside the router and congestion in the router; congestion outside

the router causes the transmit buffer on that link to back up and eventually become full. It would have been obvious to one skilled in the art at the time of the invention to operate the switch based upon congestion occurring in the router. The motivation would be to use the congestion information collected by Masuda to optimally route packets to avoid the congested port and links.

Regarding claim 9, determining when congestion occurring within the router has abated based upon status of the congestion signals is disclosed in Masuda at figure 1, element 14. Switching for all of the destination addresses in the forwarding table switched to overflow routing, from the overflow path back to the primary path when the congestion occurring within the router has abated is disclosed in Masuda, figure 1, element 11 and column 5, lines 46-47 (the path selection unit switches the optimum path on a real time basis, so that when the congestion status monitor detects that congestion has abated, the path selection unit will switch back to the original optimum path).

Regarding claim 10, running a routing protocol on a router is disclosed in Masuda, column 5, line 38. Determining at least two output paths for each of a plurality of destination addresses based upon the routing protocol is disclosed in Masuda, figure 1, element 11. Storing, for each of the addresses eligible for overflow routing, the at least 2 output paths is disclosed in figure 1, element 82, and column 8, lines 26-35. Determining which of the destination address are eligible for overflow routing based upon a network policy and at least one of a source port ID, a source IP address, and a destination address, wherein not all of the destination addresses in the network are

eligible for overflow routing is missing from Masuda. However, Rochberger discloses in column 11, lines 46-48, a router storing eligibility for rerouting that is based on the class of service of the packets, which is based on the destination address. It would have been obvious to one skilled in the art to base eligibility for rerouting on QOS in the system of Masuda. The motivation would be to reroute higher priority traffic first, to ensure its particular guaranteed QoS. Switching eligible data packets associated with one of the eligible destination addresses from the primary output path to a selected overflow path is disclosed in Masuda, figure 1, element 11 and column 4, lines 4-12. Said switching based upon congestion occurring only in the router is not specifically disclosed in Masuda or Rochberger. However, Masuda does disclose monitoring output port congestion status (which would be congestion occurring within the switch) in column 5, lines 52-54. Further, Applicant discloses in paragraph 5 of the instant specification that there is a direct relationship between congestion outside the router and congestion in the router; congestion outside the router causes the transmit buffer on that link to back up and eventually become full. It would have been obvious to one skilled in the art at the time of the invention to operate the switch based upon congestion occurring in the router. The motivation would be to use the congestion information collected by Masuda to optimally route packets to avoid the congested port and links.

Regarding claim 11, storing, for each of the destination addresses other than the destination addresses eligible for overflow routing, one output path is disclosed in Masuda, figure 1, element 82 and column 8, lines 26-35.

Regarding claim 12, monitoring congestion status on each output port of the router is disclosed in Masuda, figure 1, element 14. Detecting congestion only within the router is disclosed in Masuda, column 5, lines 52-54.

Regarding claim 13, detecting when congestion occurring only within the router has abated is disclosed in Masuda, figure 1, element 14. Switching the output of data from the overflow path back to the primary path for the destination address is disclosed in Masuda, figure 1, element 11 and column 5, lines 46-47 (the path selection unit switches the optimum path on a real time basis, so that when the congestion status monitor detects that congestion has abated, the path selection unit will switch back to the original optimum path).

Regarding claim 14, monitoring congestion status on each output port of the router is disclosed in Masuda, figure 1, element 14. Determining the amount of predetermined data packets to be overflowed based upon a predetermined level of congestion is disclosed in Masuda, figure 1, element 12 and column 8, lines 30- 36 (if buffer overflow occurs, a portion of the data will be temporarily rerouted to another path not containing any congested links). Switching, upon detection of the one of the plurality of levels of congestion on the at least one output port, the amount of predetermined data packets to be overflowed from a primary output path of the at least one output port corresponding to a destination address of the data to be output to an overflow path for the destination address is disclosed in Masuda, figure 1, element 11 and column 4, lines 4-12. Determining that predetermined data packets are eligible for overflow routing, based upon a network policy and at least one of a source port ID, a source IP address,

and a destination address, wherein not all data packets are eligible for overflow routing is missing from Masuda. However, Rochberger discloses in column 11, lines 46- 48, a router storing eligibility for rerouting that is based on the class of service of the packets, which is based upon the destination address. It would have been obvious to one skilled in the art to base eligibility for rerouting on QOS in the system of Masuda. The motivation would be to reroute higher priority traffic first, to ensure its particular guaranteed QoS. Said switching based upon congestion occurring only in the router is not specifically disclosed in Masuda or Rochberger. However, Masuda does disclose monitoring output port congestion status (which would be congestion occurring within the switch) in column 5, lines 52-54. Further, Applicant discloses in paragraph 5 of the instant specification that there is a direct relationship between congestion outside the router and congestion in the router; congestion outside the router causes the transmit buffer on that link to back up and eventually become full. It would have been obvious to one skilled in the art at the time of the invention to operate the switch based upon congestion occurring in the router. The motivation would be to use the congestion information collected by Masuda to optimally route packets to avoid the congested port and links.

Regarding claim 15, detecting the level of congestion occurring only within the router has abated is disclosed in Masuda, figure 1, element 14. Switching data packets associated with a predetermined destination address of the predetermined data packets from the overflow path back to the primary path for the predetermined destination address is disclosed in Masuda, figure 1, element 11 and column 5, lines 46-47 (the

path selection unit switches the optimum path on a real time basis, so that when the congestion status monitor detects that congestion has abated, the path selection unit will switch back to the original optimum path).

Regarding claim 16, storing a forwarding table in the router is disclosed in Masuda, figure 1, elements 131 and 132. The forwarding table having entries respectively corresponding to destination addresses in the network and identifying at least two output paths from the router for at least one of the destination addresses to enable overflow routing, one of the at least two output paths being identified as a corresponding primary path and other of the at least two output paths being identified as overflow paths is not specifically disclosed in Masuda. However, the H/W table of Masuda holds whichever optimum path has been selected based on the instant congestion levels, sometimes it will be the usual optimum path, sometimes it will be another path, depending on the current congestion status in the network. See Masuda, column 8, lines 4-7. it would have been obvious to one skilled in the art at the time of the invention to have a table holding all of the possible primary and backup paths that are used in Masuda. The motivation would be to compile the primary and overflow path data in one place.

Regarding claim 17, collecting link state advertisements from other routers in the network, wherein the link state advertisements are adapted for use in the determining at least two outlet paths step, and constructing a graph in the router using the link state advertisements is disclosed in column 4, lines 33-34 of Masuda (the monitor cells are link state advertisements) and column 4, lines 20-25 and 28-32 (the congestion

information is used to determine the least-cost paths, this information may be considered to be in graph form).

Regarding claim 18, prioritizing the at least two corresponding output paths is disclosed in Masuda, column 4, lines 6-12 (many possible paths are calculated, and the best one is selected as optimum). The prioritizing being based on possible IP packet priorities is missing from Masuda. However, Rochberger discloses in column 11, lines 46-48, deciding which route packets will be sent on based on QoS. It would have been obvious to one skilled in the ad at the time of the invention to reroute the packets on the various alternate paths based on their priorities. The motivation would be to reroute higher priority traffic on a less congested path, to ensure its particular guaranteed QoS.

3. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Masuda in view of Rochberger in further view of Ofek. Encapsulating an IP packet according to an MPLS protocol, the IP packet adapted to be routed on one of the at least two corresponding output paths is missing from Masuda. However, Ofek discloses in column 3, lines 8-15, a network using MPLS encapsulation. It would have been obvious to one skilled in the art at the time of the invention to use the MPLS protocol in the system of Masuda. The motivation would be to replace the destination address with a short tag, thereby shortening the packet to improve throughput.

4. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Masuda in view of Rochberger in further view of Bentall. Determining the at least two corresponding output paths step uses a K-diverse shortest path algorithm is missing from Masuda and Rochberger. However, Bentall discloses in column 1, lines 47-49, use

of a k-shortest paths algorithm form rerouting. It would have been obvious to one skilled in the art at the time of the invention to use a K-diverse shortest path algorithm in the system of Masuda. The motivation would be to use a known algorithm (Bentall, column 1, line 43).

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Cynthia L. Davis whose telephone number is (571) 272-3117. The examiner can normally be reached on 8:30 to 6, Monday to Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Huy Vu can be reached on (571) 272-3155. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

CLD
1/18/2005

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1/18/06

HUY D. VU
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600